

### REMARKS/ARGUMENTS

The claims are 2-4, 7-9 and 12-14. Claims 1, 5 and 11 have been canceled in favor of new claims 12-14 respectively, to better define the invention and to incorporate in part subject matter previously appearing in claim 6. Accordingly, claim 6 has been canceled, and claims 2-4 and claim 7, which previously depended on claims 1 and 6 respectively, have been amended to depend on new claims 12 and 13 respectively. These claims and claims 8-9 have also been amended to improve their form. Claim 9 has also been amended to depend expressly on claim 8. In addition, the specification has been amended to correct a clerical error noted therein. Support for the claims may be found, *inter alia*, in the disclosure at page 21 and in original claim 6. Reconsideration is expressly requested.

Claim 9 was objected to on formal grounds for using the phrase "according to the above claim" in line 1, which Applicant has corrected herein by amending claim 9 to expressly depend on claim 8, thereby obviating the Examiner's objection on the basis of this informality.

Claims 1, 2, 4-9 and 11 were rejected under 35 U.S.C. §102 as being anticipated by Japanese Patent No. 361213735A. The remaining claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over the Japanese '735A reference. Essentially, the Examiner's position was that the Japanese '735A reference discloses the method and device recited in the claims except for carrying out the method automatically which was considered by the Examiner within the skill of the art.

In response, Applicant has canceled claims 1, 5 and 11 in favor of new claims 12-14 and respectfully traverses the Examiner's rejection for the following reasons.

As set forth in new claim 12, Applicant's invention provides a method for determining at least one characteristic of a molten metal having a slag layer on a surface of the molten metal. In accordance with the method, a measuring device for generating measurement data for the at least one characteristic and a processing device arranged outside the molten metal for processing the measurement data are provided, the measuring device having a transmission antenna for directly and wirelessly transmitting the measurement device to the processing device. The measuring device is introduced into the molten metal so that

the bottom end of the measuring device penetrates the slag layer on the surface of the molten metal and immerses into the molten metal and the transmission antenna at least partly projects above the slag layer. In this way, the measurement data may be directly and wirelessly transmitted from the measuring device via the antenna to the processing device.

As set forth in new claim 13, Applicant's invention provides a device for determining at least one characteristic of a molten metal having a slag layer on the surface of the molten metal which includes a measuring device for generating measurement data of the at least one characteristic, and a processing device arranged outside the molten metal for processing the measurement data. The measuring device includes a transmission antenna and is introduceable into the molten metal to perform a measurement and to directly and wirelessly transmit the measuring data from the measuring device to the processing device. The antenna is arranged at a sufficient distance from the bottom end of the measuring device so that upon introduction of the measuring device into the molten metal, the bottom end penetrates the slag layer on the surface of the molten metal and immerses into the molten metal and the antenna at least partly projects from the slag layer.

As set forth in new claim 14, Applicant's invention provides a measuring device for introduction into molten metal having a slag layer on the surface of the molten metal and for generating measurement data of at least one characteristic of the molten metal. The measuring device includes a transmission antenna arranged at a sufficient distance from a first end of the measuring device so that upon introduction of the measuring device into the molten metal, the first end penetrates the slag layer on the surface of the molten metal and immerses into the molten metal and the antenna at least partly projects above the slag layer.

With Applicant's method and devices recited in new claims 12-14, it is possible to measure physical or chemical characteristics in or on molten metal and to transmit the measurement data without interference to a receiver arranged above the molten metal.

For a better understanding of this cited *Japanese '735A* reference, Applicant is submitting an English translation of the document for the Examiner's consideration. In contrast to Applicant's invention as recited in claims 12-14, the device according to *JP '735A* is not usable in a converter filled with molten metal (iron/steel) and as is always the case, with a slag

layer upon the molten metal. First, in the *JP '735A* reference, the lower part of the device seems to be quite short so that the thermocouple probably does not reach the molten metal if it is covered by a slag layer. Second, in a preferred embodiment, the device disclosed in the *JP '735A* reference is equipped with a flange part, which might also prevent the device from passing through the slag layer. Further, the device according to the *JP '735A* reference is not appropriate for detecting other characteristics than the temperature because the sensor does not sink into the molten metal deeply enough, which is necessary to make for example an oxygen measurement. Moreover, an oxygen measurement requires much more time than a measurement of temperature, which the *JP '735A* reference would be unable to perform in molten metal.

In the *JP '735A* reference, moreover, no slag layer is mentioned, not least because the device is used only in a melting furnace, in which no slag layer is present. In contrast, Applicant's method and devices as recited in claims 12-14 may be used and are typically used in converters, where a slag layer upon the molten steel is always present and can reach a thickness of 0.3 m to 0.5 m.

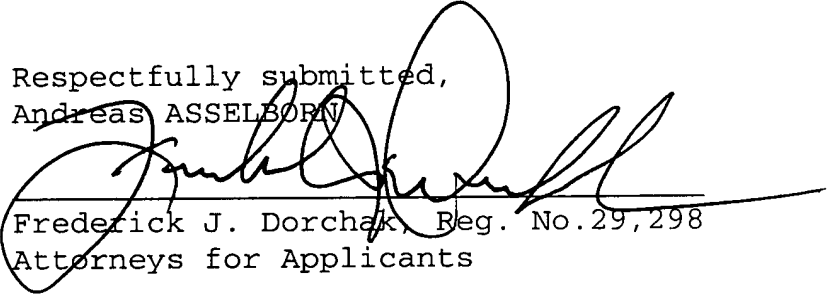
Accordingly, it is respectfully submitted that new claims 12-14 together with claims 2-4 and 7-9, which depend directly or indirectly on claims 12 and 13 respectively, are patentable over the JP '735A reference.

In summary, claims 2-4 and 7-9 have been amended, claims 1, 5, 6 and 11 have been canceled, and new claims 12-14 have been added. The specification has also been amended. In view of the foregoing, it is respectfully requested that the claims be allowed and that this case be passed to issue.

Applicant also submits herewith a Supplemental Information Disclosure Statement.

Respectfully submitted,  
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Enclosure: Translation of JP 361213735A  
Supplemental Information Disclosure Statement

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on January 29, 2007.

  
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